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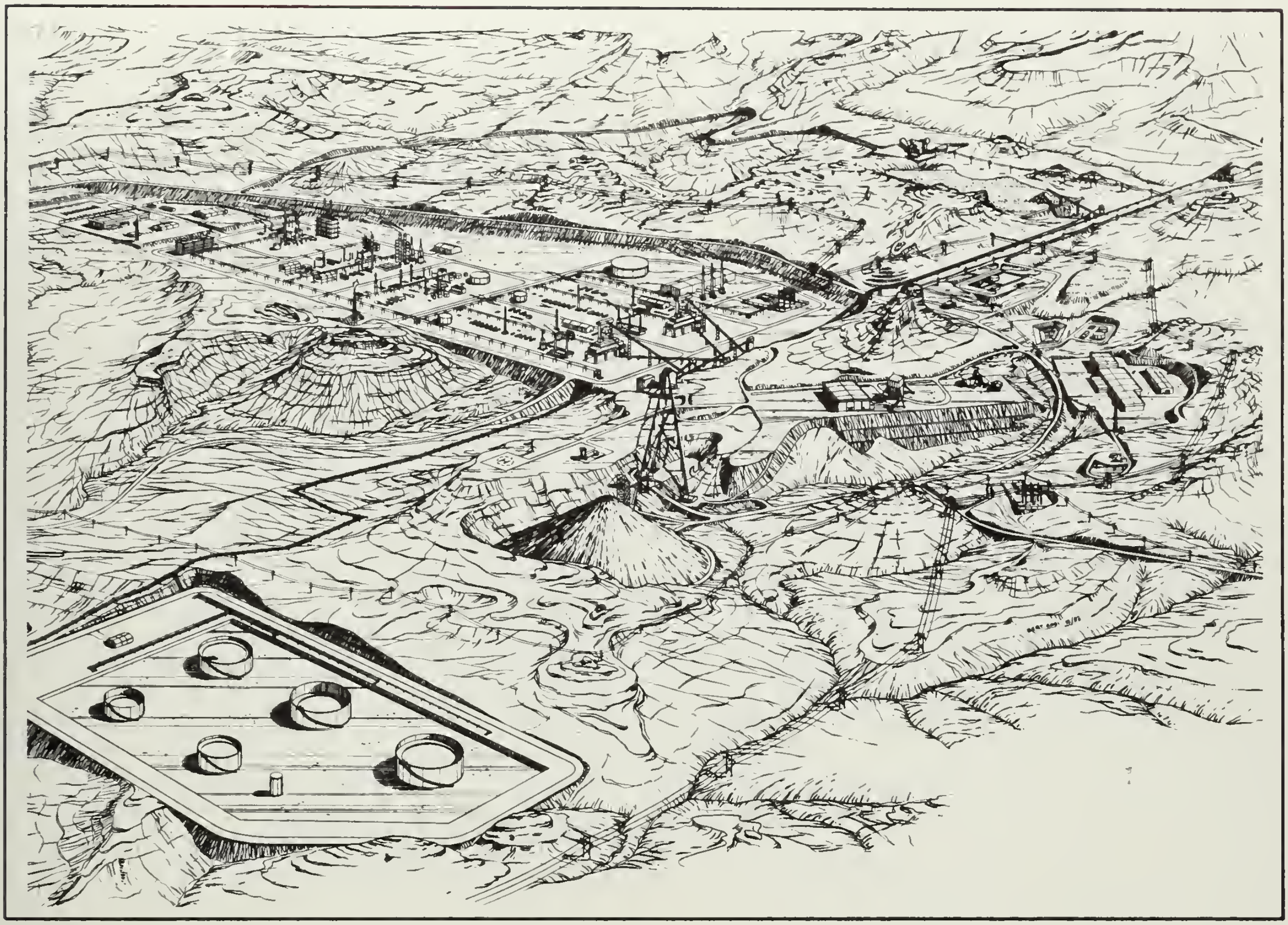

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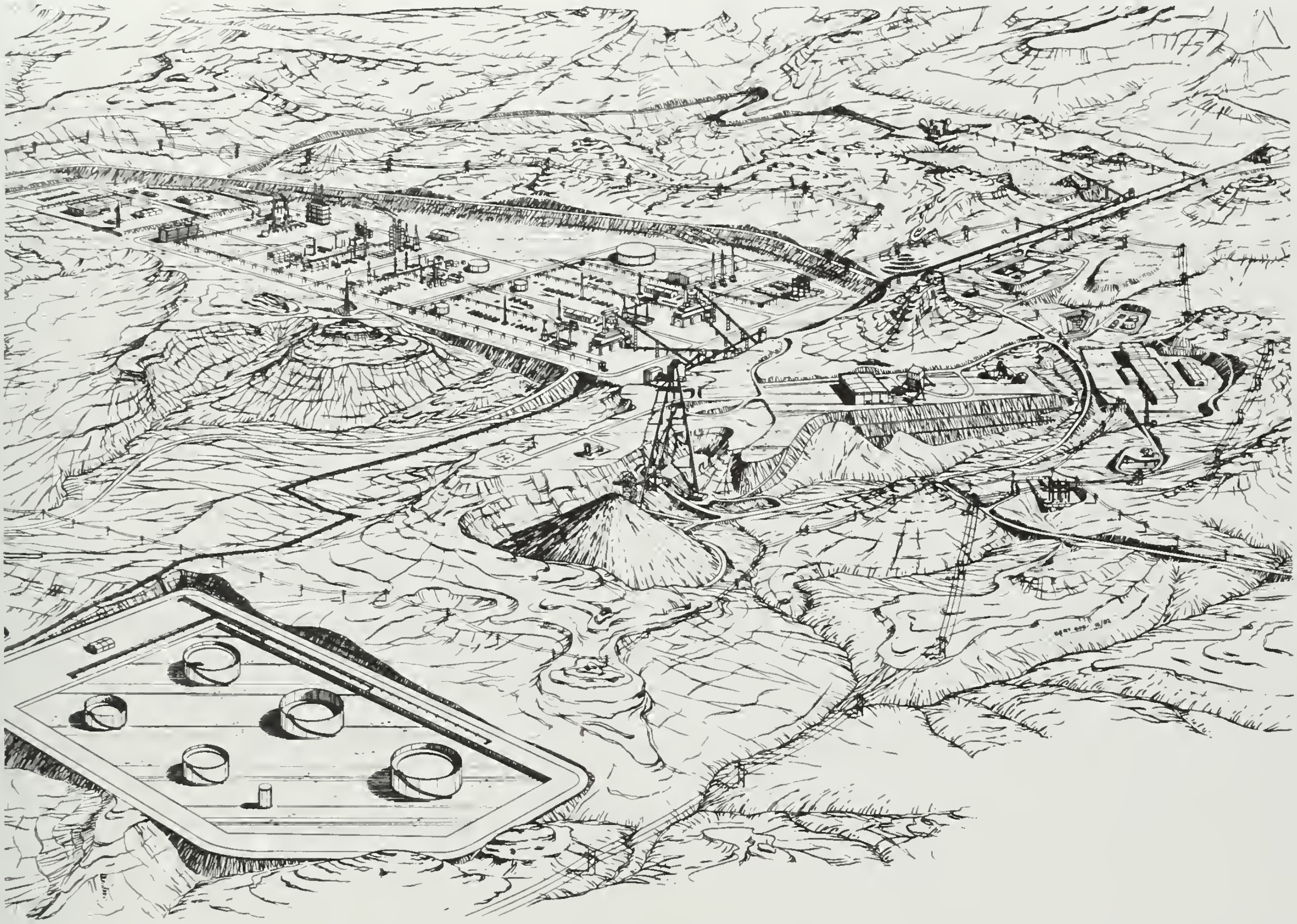

PHASE I
WHITE RIVER SHALE PROJECT HEALTH AND SAFETY MONITORING PROGRAM OUTLINE

Submitted to
United States Synthetic Fuels Corporation

NOVEMBER 1983

Prepared by White River Shale Oil Corporation
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PREFACE

The White River Shale Project (WRSP) involves the development of Federal Prototype Oil Shale Lease Tracts Ua and Ub and associated Group 1 properties in northeastern Utah. The tracts were acquired in 1974 by the project sponsors - Phillips Petroleum Company, Sohio Shale Oil Company, and Sunoco Energy Development Co. The tracts are located in the eastern portion of the Uinta Basin of Uintah County, south of Bonanza and contiguous to the White River, which borders the tracts on the north. The White River Shale Oil Corporation (WRSOC) has been retained by the project sponsors to manage development of the WRSP.

The intent of the project sponsors is to develop the properties to produce commercial quantities of shale oil. The WRSP plans call for a staged development in three phases. Phase I comprises mining, oil shale retorting, and shale oil upgrading facilities designed to generate specific information on ore body characteristics, retorting and shale oil processes, and environmental protection. Up to 30,000 tons per day (tpd) of oil shale will be mined in this phase. Phase I is designed to produce approximately 16,500 barrels per stream day (bpsd) of upgraded shale oil.

Modified room-and-pillar underground techniques will be used at the WRSP to mine the oil shale. Mined shale will be crushed and screened to produce required size ranges. After crushing, the shale will be processed in surface retorts. Phase I will consist of two Unishale B retorts, for which a license has been issued

to the sponsors by Union Oil Company of California. The resultant shale oil will be upgraded onsite to a synthetic crude oil.

Phases II and III will involve expansion of shale oil production to levels of approximately 57,000 and 106,000 bpsd, respectively.

The owners have filed for financial assistance from the U.S. Synthetic Fuels Corporation (SFC) for Phase I of the WRSP. In accordance with Section 131e of the Energy Security Act, an Environmental Monitoring Plan Outline has been developed that addresses SFC's final Environmental Monitoring Plan Guidelines. The WRSP Environmental Monitoring Plan Outline consists of three separate documents: the Source Monitoring Plan Outline, the Health and Safety Monitoring Program Outline, and the Environmental Monitoring Manual, June 1982 (i.e., Ambient Monitoring Program). The three programs are interrelated and together form the basis for an Environmental Monitoring Plan that is intended to identify significant project impacts on the ambient environment and the health and safety of project workers.

Each program will monitor key environmental components or emissions that are important to each program area. The source program will monitor solid, liquid, and gaseous emissions at various points throughout the plant site. The ambient program will monitor vegetation, terrestrial and aquatic biology, surface and groundwater quality and hydrology, and air quality, climatology and meteorology in the vicinity of the WRSP. The occupational health and safety program will

evaluate the effects of the project on employee health and provide data useful to a worker registry.

The Source Monitoring Plan Outline is separated into two separate tasks: Compliance Monitoring and Supplemental Monitoring. Compliance Monitoring addresses monitoring that is required by terms and conditions of permits and approvals or other regulatory obligations. While a significant number of permits have been issued for the WRSP, it was often necessary to make assumptions concerning anticipated permit conditions in order to develop the Compliance Monitoring section of the Source Monitoring Plan Outline. For this reason, as actual permit conditions are stipulated, the final form of the Compliance Monitoring Program could vary from the outline.

Supplemental Monitoring refers to any monitoring that is not required by permit approval conditions or regulatory obligations. The major goal of Supplemental Source Monitoring is to document whether certain unregulated substances exist in concentrations suspected of causing carcinogenesis, mutagenesis, teratogenesis, reproductive effects, or other systemic disorders and environmental effects.

The proposed Supplemental Monitoring Program will use a two-phase approach to monitor unregulated pollutants. The first phase will emphasize a number of screening and routine monitoring techniques to identify substances of potential environmental and health concern. These screening data will then be evaluated to

determine the scope of the ongoing Supplemental Monitoring Program that will constitute the second phase of the program. Only those waste streams that come in contact with the environment will be addressed in the Supplemental Monitoring Program.

The WRSP Health and Safety Monitoring Program Outline is separated into two distinct programs: an Occupational Safety Program that involves the establishment of criteria to prevent personal injury from moving equipment, hot vessels, etc., and a Health Monitoring Program that will be designed primarily to monitor and record the status of employee health relative to routine or episodic exposures to significant compounds at the WRSP. The health program will also document and quantify occupational exposures to significant unregulated substances that may be encountered during such processes as oil shale mining, shale processing, shale oil upgrading, and disposal of processed shale and wastewaters.

The WRSP has developed and is currently implementing a detailed ambient monitoring program that will track the impacts of project development, evaluate success of planned mitigation measures, and provide feedback to design and operations to minimize any identified environmental effects. The ambient program is described in the WRSP Environmental Monitoring Manual. The ambient monitoring program is the product of 9 years of continuous field monitoring (1974-1983) at the project site, during which time the environment was characterized, coupled with a careful evaluation of probable impacts expected from the current tract development plan. An environmental description of the

WRSP site and a summary of baseline environmental data are contained in Section 2 of The Detailed Development Plan (1981) and the Final Environmental Baseline Report (1977) prepared for the WRSP.

The Environmental Monitoring Manual was prepared in 1982 in consultation with the Oil Shale Office and the Oil Shale Environmental Advisory Panels (which consists of participants from various federal, state, and local agencies including the U.S. Fish and Wildlife Service (FWS), Bureau of Land Management (BLM), Environmental Protection Agency (EPA), Department of Energy (DOE), and the Utah Department of Natural Resources and Energy). In addition, the Environmental Monitoring Manual has also been the subject of extensive public review.

The major goal of the ambient program as discussed in the Environmental Monitoring Manual is to provide a body of information that describes the ecology of the project area in a manner which will:

(1) Allow assessment of changes occurring in the physical and biological characteristics of the tracts that result from the impact of surface disturbances and pollutant discharges.

(2) Guide analysis of causes and effects, thus leading to appropriate mitigation planning.

(3) Guide and assess the effectiveness of mitigation and reclamation measures.

This goal is being met by accomplishing the following tasks, which are detailed in the Environmental Monitoring Manual:

(1) Describe methods that will be used to document the environmental conditions that exist in the project area.

(2) Identify candidate monitoring parameters, sites, and schedules based on the probability of impact, importance, legal requirements, measurability, interpretability, and cost-effectiveness.

(3) Develop statistical procedures for detecting and evaluating the degree of impact.

(4) Develop a quality control/quality assurance program.

(5) Identify criteria for selection of threshold values for specific parameters.

(6) Describe contingency measures to be implemented if the monitoring program fails to explain an environmental perturbation.

As discussed previously, the ambient program described in the Environmental Monitoring Manual was implemented in 1982 and is currently in progress. For this reason, the final ambient monitoring plan (in the form of the Environmental

Monitoring Manual) has been submitted to SFC in lieu of the requested ambient monitoring plan outline.

All three monitoring programs include a phase where parameters are screened for inclusion during routine analyses. In the ambient program, this is a tiered approach using potential, operational, and contingency parameters. In the source and health and safety monitoring programs, a definitive preliminary screening phase is clearly specified. In all cases, screening processes will be used to identify those parameters that most clearly reflect the existing environmental conditions during the project life. This will limit the data collection effort to only the most essential and useful variables.

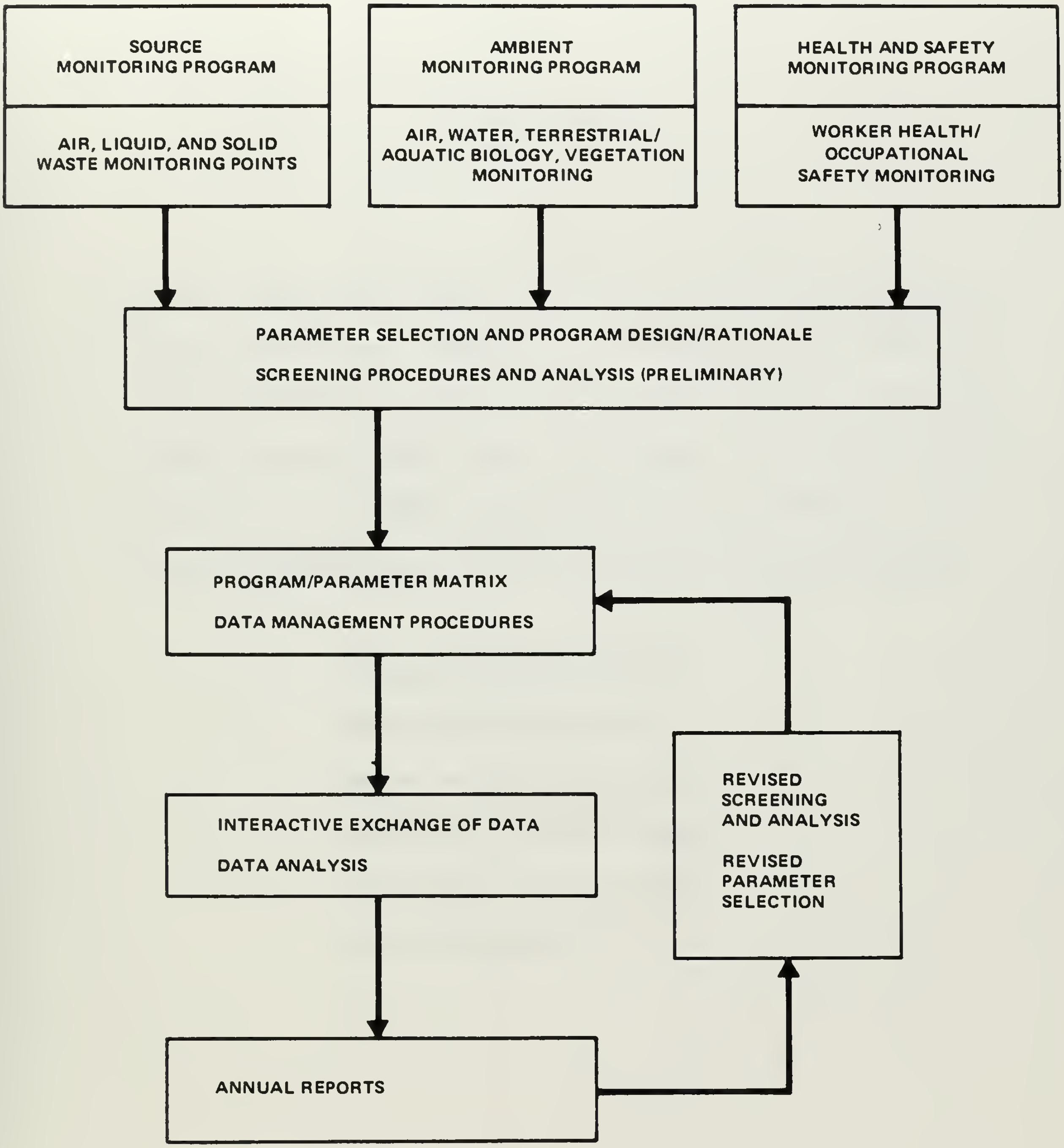
The initiation of the overall monitoring plan will result in large amounts of data being collected from a number of different monitoring points. These data will require careful storage and retrieval procedures. Hence, a data management system will be developed to accurately and quickly access data from all three programs for report generation and analysis. The flow of data and the evaluation of interrelationships among the three individual plans are shown on the last page of this preface.

To adequately assess environmental impacts, data from the three monitoring programs will be exchanged so that both temporal and spatial comparisons can be made. For example, to assess worker health effects of particulates in the area, data from monitors that measure fugitives and emissions from the plant (Source

Monitoring Program), the high-volume samplers (Ambient Monitoring Program), and area monitoring (Health and Safety Monitoring Program) will be gathered and analyzed. A well-documented and accurate flow of data into the statistical/analytical procedures will be used to generate meaningful reports. This role will be filled by the data management system.

Annual reports discussing the results of the overall Environmental Monitoring Progam will be prepared and submitted to SFC. An analysis of significant trends and results will be included in these reports. Furthermore, it is anticipated that semiannual coordination meetings between the SFC and its consulting agencies and the WRSOC environmental staff will be held to consider results of the monitoring program and to evaluate its continuing status and direction. All changes to the WRSP Environmental Monitoring Program will be preceded by consultation with and approval of the appropriate governmental agency(ies).

ENVIRONMENTAL MONITORING PLAN


SOURCE MONITORING PROGRAM
AIR, LIQUID, AND SOLID WASTE MONITORING POINTS
AMBIENT MONITORING PROGRAM
AIR, WATER, TERRESTRIAL/ AQUATIC BIOLOGY, VEGETATION MONITORING
HEALTH AND SAFETY MONITORING PROGRAM
WORKER HEALTH/ OCCUPATIONAL SAFETY MONITORING
PARAMETER SELECTION AND PROGRAM DESIGN/RATIONALE
SCREENING PROCEDURES AND ANALYSIS (PRELIMINARY)
PROGRAM/PARAMETER MATRIX
DATA MANAGEMENT PROCEDURES
INTERACTIVE EXCHANGE OF DATA
DATA ANALYSIS
ANNUAL REPORTS
REVISED SCREENING AND ANALYSIS
REVISED PARAMETER SELECTION

ACKNOWLEDGMENT

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Phillips Petroleum Company
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The Ralph M. Parsons Company
The Standard Oil Co. (Ohio)
VTN Consolidated, Inc.

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SECTION 1

INTRODUCTION

Section 131e of the Energy Security Act requires that any organization seeking financial support from the U.S. Synthetic Fuels Corporation must prepare an Environmental Monitoring Plan. According to SFC guidelines, such a plan should include a substantive outline and description of Health and Safety Monitoring that would address the worker environment relative to such processes as oil shale mining, shale processing, shale oil upgrading, and, finally, the disposal of processed shale and wastewater.

The White River Shale Project Health and Safety Monitoring Program Outline is separated into two distinct programs: an Occupational Safety Program Outline, which involves the establishment of criteria to prevent personal injury from moving equipment, hot vessels, etc.; and a Health Monitoring Program Outline, which will be designed primarily to monitor and record the status of employee health relative to routine or episodic exposures to significant compounds at the White River Shale Project. Moreover, the Health and Safety Monitoring Program will document and quantify occupational exposures to significant unregulated substances.

SECTION 2

HEALTH MONITORING PROGRAM

The Health Monitoring Program consists of an analysis of health hazards associated with the WRSP, monitoring of industrial hygiene and employee exposure, medical surveillance monitoring, and provision for medical assistance.

2.1 ANALYSIS OF HEALTH HAZARD

The objective of the Health Monitoring Program is to identify potential health hazards associated with the WRSP. To this end, the workplace environment will be assessed according to its various components as:

JOB EXPOSURE CODES

P - Physical environment
R - Ionizing radiation (C Subset)
I - Inhalant dusts (C Subset)
N - Noise and vibration (P Subset)
C - Chemical agents
F - Functional aspects of work (Ergonomics) (F Subset)

Utilizing this approach, each signicant identifiable physical or chemical agent or significant functional component will be listed as a part of a master inventory of health hazards, stress factors, or environmental characteristics.

Drawing from this inventory, each job will be assessed for its functional components and physical and chemical agent exposure, and a job exposure inventory will then be assembled.

From the job exposure inventory, listed items may be assessed individually for their contribution to workplace risk. Risk codes may then be categorized as follows:

RISK CODES

0 - Past exposure only (applied to job).

1 - Intermittent exposure below an action level.

2 - Continuous exposure below an action level.

3 - Intermittent exposure above an action level, and below TLV or PEL.

4 - Continuous exposure above an action level, and below TLV or PEL.

5 - Intermittent exposure above TLV or PEL or occasionally above STEL.

6 - Continuous exposure above TLV or PEL or frequently above STEL.

7 - Past exposure, no current exposure (applied to employee).

Once these risk values have been established, a priority set exists. An intensive mitigation program will be initiated for those agents or components which indicate that exposure or risks are above TLVs, PELs, or internal action levels (i.e., levels set by skill, judgment, or by

prudence). For instance, those inventory items whose exposure risks are below action levels will be maintained in inventory, but no specific action will be taken, nor will specific educational or motivational programs be undertaken. If the agent is a generic chemical or a trade-name chemical mixture, material safety data sheets will be obtained and kept on file in the workplace. If the risk exceeds an action level, good work practices will incorporate instruction and methods of safe handling, storage, and disposal of the chemical agents and will address means of mitigating exposure to physical agents.

Where specific protective measures prove necessary, such as respiratory equipment, impervious clothing, eye protection, etc., these will be specified uniquely.

At very high levels of risk, increasing protective measures may be utilized, including the use of anticontamination clothing, self-contained or air-supplied breathing apparatus, impervious shields, aprons, coveralls, boots, gloves, etc.

In brief, the response will be tailored to the recognition of hazard, and will be well documented in instructional procedures, manuals, bulletins, and repetitive educational sessions, so that both management and workers are aware in a clear and understandable way about the presence of risk, the level of risk, and the response to the control or mitigation of such risk.

While much of these data can be anticipated, the exact configuration will depend upon actual analysis of health hazards in the operating plant.

2.2 INDUSTRIAL HYGIENE AND EMPLOYEE EXPOSURE MONITORING

Establishing the degree of employee exposure to workplace substances is an important task within the health monitoring program. Several systems can be used to provide employee exposure data. A validated sampling strategy will be employed to measure employee exposure.

The general health hazards associated with the oil shale resource have already been identified. Substantial animal toxicological data has been accumulated regarding the toxicity, mutagenicity, teratogenicity, and carcinogenicity of oil shale. Only limited, recent, representative human experience is available; however, it has been utilized in the preparation of this health management plan.

Raw shale oil also has been subjected to extensive toxicological study, as has its hydrotreated product. While the entire panorama of shale-derived products and residues has not been tested completely, experiences from similar or identical petroleum derived product streams, processes, and chemical mixtures have been used to evaluate health hazards.

Preliminary analysis and sampling as well as a screening program will confirm the presence or absence of a variety of compounds believed to be associated with shale oil production facilities. The ambient and source

monitoring systems will also provide useful data for the analysis of health hazards.

Definitive relationships between remote and area monitoring can also be made that allow one set of data to be used for many purposes. For example, stack emission concentration, wind velocity, and entrainment factors can predict a concentration of emitted compounds at locations downwind of the stack. Such data, gathered by the source monitoring program, would be useful in the health monitoring program.

The health monitoring program will assume that certain chemicals of concern are present in the workplace while other chemicals are absent or exist only in insignificant concentrations. The compounds monitored by the health program may be modified as a result of findings from the operational monitoring programs. As sampling continues and the shale oil production facility matures, the health plan may be adjusted to permit less intensive sampling routines.

Industrial hygiene monitoring will be implemented to monitor workers who are involved in each of the important steps in shale oil production. For purposes of this outline, these steps are grouped into the following categories: mining of shale; oil shale processing and upgrading into synthetic crude; processed shale and wastewater handling/disposal; and administrative operations. Initially, each category will be monitored for response to the presence of specific compounds listed in Table 2-1.

Table 2-1 - Monitoring Parameters

Mining and Subsurface Operations	Processed Shale and Wastewater Operations	Processing and Upgrading	Shale Oil Handling	Administration
a) Fibrous minerals as particulates and dust	a) Fibrous minerals as particulates and dust	a) Fibrous minerals as particulates and dust	a) Fibrous minerals as particulates and dust	a) Fibrous minerals as particulates and dust
b) Arsenic compounds as particulates	b) Free silica as particulates	b) Arsenic compounds as particulates	b) Free silica as particulates	b) Heavy metal compounds as particulates and gases
c) Free silica as particulates	c) Total hydrocarbons in dissolved and suspended phases	c) Nickel compounds as particulates	c) Heavy metal compounds as particulates and gas	c) Arsenic/nickel compounds
d) Total hydrocarbons sorbed onto particulates	d) Heavy metals as particulates and in dissolved and suspended phases	d) Mercury compounds	d) Nitro-organic compounds as gas and particulates	d) Soluble particulates
e) Heavy metal compounds as particulates	e) Gases: H_2S, NH_3, phenol vapors, hydrocarbon vapors	e) Soluble particulates	e) Sulphur organic compounds as gas and particulates	e) Gases, H_2S, CO, CO_2, SO_x, NO_x, NH_3, methane, formaldehyde, phenol
f) Soluble particulates (isotonic saline, fat and lung surfactant)	f) Nitro-organic compounds as gas and in solution	f) Heavy metal compounds	f) Soluble particulates	f) Nitro-organic compounds as gas and particulates
g) Gases: H_2S, CO, CO_2 SO_x, NO_x, NH_3, methane, explosive vapors, thiophenes	g) Sulphur organic compounds as gas and in solution	g) Gases: H_2S, CO, CO_2, SO_x, NO_x, NH_3, formaldehyde, phenols, As, Mo, Cd, B, Hg, Mo elements and compounds	g) Gases: H_2S, CO, CO_2, SO_x, NO_x, NH_3, methane, formaldehyde, phenols	g) Sulphur organic compounds as gases and particulates
h) Nitro-organic compounds as gases and particulates	h) Soluble particulates	h) Nitro-organic compounds as gas, liquid, solids (nitro-heterocyclics)	h) Polynuclear aromatic hydrocarbons	h) Polynuclear aromatic hydrocarbons as gases and sorbed on particulates
i) Sulphur organic compounds as gas particulates	i) Carbon black particles suspended in air and water	i) Sulfur organic compounds as gas, liquid, solids		i) Nitro-heterocyclic hydrocarbons
j) Radionuclides	j) Nickel/arsenic compounds dissolved and suspended	j) Polynuclear aromatic hydrocarbons		
	k) Polynuclear aromatic hydrocarbon			
	l) Nitro-heterocyclic hydrocarbons			

The health monitoring program will also identify specific areas of the facility which are to be monitored. For purposes of this plan, a "monitored area" will not be defined as a building or a diked pit, but as the area that contains or provides the significant concentration of the chemical being monitored.

In general, monitoring programs will be used to test the integrity of the entire operating system, with special attention to valves, seals and joints, pumps, and sampling or observation ports where potential for leaks is greater.

The chemicals, including generic chemicals and trade-name chemical mixtures, will be identified and added to the master chemical inventory for the mine and plant. Each item will be assessed for its intrinsic hazard and exposure potential using standard industrial hygiene approaches. Where necessary, actual monitoring and measurements will be taken in order to increase the accuracy of the risk estimation.

Area sampling may be conducted by continuous monitoring as applicable for noise, vapors, etc. Area measurements or individual dosimetry of airborne vapors, mists, or particulate will be performed using suitable pumps and filters. Volatile and gaseous components will be measured utilizing suitable absorbent media such as charcoal tubes, mylar bags, or resin-packed tubes suitable to the component being measured. Results of these surveys are recorded in a standard form, and where representative dose levels are established by measurement, either by area measurements or by

individual dosimetry, these results will be reported as individual exposure reports to management and to exposed individuals. This method satisfies OSHA's requirement for access to exposure records.

Noise monitoring, utilizing sound level meters, impact analyzers where applicable, and octave band analyzers will be utilized to establish the sound map of the facility. Results of sound level surveys will be plotted during the construction and operating modes of the mine and plant. The system requires the establishment of noise level isopleths around noise sources. Efforts will be made to reduce excessive noise levels by engineering methods and administrative practices; if not feasible, suitable methods of hearing protection will be provided and a hearing conservation program instituted.

The noise exposed population is identified by establishing action levels of accumulative exposure over an 8-hour period, or greater. A noise exposed population will require a program of audiometry. Personal noise dosimetry will also be required.

Heat stress monitoring will be conducted where high temperature process vessels or equipment creates a heat hazard. Particularly, confined spaces with heat buildup will receive attention. Heat stress determinations will be made with a portable analyzer.

The geological formation indicates that there is very little or negligible radioactive risk, so that the only radiation hazards in the environment are those associated with instrumentation, such as level gauges, flow meters, and calibration sources. As these are sealed sources, usually provided in service by contractors, they represent level 1 (intermittent exposure below an action level), and it is unlikely that a program of radiation dosimetry will need to be established. Consequently, radiation monitoring will probably be minimal or absent.

2.3 MEDICAL SURVEILLANCE MONITORING

2.3.1 EMPLOYEE SELECTION

Since this operation is in a relatively remote location, immigration of workers to staff the facility is to be expected. For the mining portion of the operation, experienced workers are desirable. Employee applicants will be screened for their suitability to undertake specific job tasks based upon the exposure risks of the job.

Preplacement selection, therefore, requires comprehensive history-taking and medical evaluation that keeps these requirements in mind.

The source of workers in the western area may include individuals who have previous mining exposures, including uranium mining and milling; therefore, careful occupational history must be recorded. This will include life-to-date radiation doses if occupational

radiation exposure has taken place, including NRC Form 100, Radiation Exposure History, and NRC Form 5, Accumulative Lifetime Dose Record. Statements relative to other exposures, such as mine dusts, also require evaluation when determining the employee's suitability to undertake the assigned work.

The medical evaluation also includes a comprehensive physical examination evaluating special senses of sight and hearing, pulmonary function, chest radiography, and suitable laboratory procedures including urinalysis, and evaluations of blood cytology and chemistry. The results of the examination are supplemented by questionnaires relative to past noise exposure, smoking, and alcohol use, which are made a part of the permanent record. Such evaluation constitutes the basis for the physician's recommendation to the employee as to work capabilities. This information informs management of altered work capabilities or special considerations that have to be evaluated in assigning the employee to work.

The examining physician must be thoroughly aware of the inventory of agents, substances and functional requirements of the job or jobs to which the individual may be assigned. Careful evaluation of the individual relative to the potential risks and stresses of work, plus the functional requirements of work, allow that a specific statement can be made to the individual and to management as to the individual's capability to undertake and sustain the

requirements of work. All health records are maintained in a strictly confidential fashion.

The record, thus obtained, is summarized for data reduction and nosological coding, computer input, and storage. The health information thus becomes a repository for a clearly defined health program.

2.3.2 MAINTENANCE OF A DYNAMIC DATA BASE FOR EACH EMPLOYEE

The physical/clinical evaluation of each employee will be performed using the SNOMED type evaluation and confidential encoding of the data. The SNOMED scheme enables a physician to assign a series of numeric codes to describe various body organs or systems; these SNOMED codes include:

0	General Body Topography
1	Musculoskeletal and Soft Tissues
2	Respiratory System including pulmonary function
3,4	Cardiovascular System
5,6	Digestive and Gastro-intestinal System
7,8	Genital-Urinary System
9	Endocrine System
X	Neural and Special Senses
Y	Topographic Regions

The physical examination and clinical evaluation will be encoded on special data sheets that are readily entered into the computer. Each employee will be identified by a unique number to maintain confidentiality. The data base for an employee is thus initiated and maintained with this physical/clinical information set and the individual employee data base then becomes a part of the health information system. The employee's data base is thus separate and unique but still a part of the entire health information system for the company.

The health information system will consist of five basic files:

File 1 - Master file of employee data extracted from payroll and personnel systems, which will supply all demographic identifiers. This file will also contain the medical profile and job exposure table. It is updated with medical data and can be accessed (selected) via files 2 and 3.

File 2 - Contains all diagnostic entries coded to some medical standard and to the SNOMED code system. The medical profile is repeated as type/class entries.

File 3 - A job exposure inventory. This file will display assessments and code numbers for each physical and chemical agent as applicable to each individual job and must include both onsite and offsite exposure data (if appropriate).

This file is updated by current exposure data research. File 3 can be activated/accessed by all other files. The example Job Exposure Codes discussed in Part A will be utilized in this file.

File 4 - Master code inventory, which lists all significant chemicals present on the site, indentifying mixtures by a four digit master code and generic chemicals by CAS number. The master code is incorporated in to the CAS number field when identification is complete and/or novel numbers are assigned to chemicals not identified by CAS. A chemical inventory by job code is related to job assignment; exposure correction data may also be included.

File 5 - Individual Exposure Report file. This file is constructed from actual monitoring/sampling measurements, and is related to area sampling or to individual employee exposure data. Ultimately, sampling strategy may conclude that monitored concentrations can be corrected to yield all related individual employee exposures as a function of job exposure.

All five files are interactive and access to one file is available from any other file. Analysis of the data can be extracted from epidemiological study, audit of data, and conduct of programs.

These files will allow management to reassess the employee health risks and environmental standards, inherent in the operation, with regard to the latest findings published in the literature. These files will also serve as a forensic record of "known risks" which demonstrates management's concern for employee and environmental health.

2.3.3 EMPLOYEE HEALTH REGISTRY IN THE DYNAMIC DATA BASE

The monitoring program and computer data base described above will provide an acceptable and valid compilation of employee health records and occupational health data. The current "right to know" laws can be implemented by simply extracting an employee's coded data base and translating all numerically coded data into a meaningful description of past medical history, current exposure and risk assessment. Such data may also be used to reassign employees to other occupations, in addition to the initial assignment of any employee to certain occupations. The computerized records, if supplemented by the findings of a licensed physician, can be legal documentation of health examinations and reassessment of occupation hazards.

The degree of exposure risk, prudence, or management policy may institute a periodic monitoring evaluation of employee's health. This will include evaluations of pulmonary function of miners, including chest radiography, perhaps pulmonary cytology, audiometry for noise-exposed populations, and specialized tests as

they are applicable to specific exposure risks. Data obtained from these examinations are also extracted for computer input and retention.

Intercurrent health events, occupational and nonoccupational injury or illness, are similarly identified, and data extracted for computer input and storage.

The summation of these data, including a health record begun at the time of employment, augmented by periodic surveillance and recording intercurrent health events, constitutes a chronological record of the employee's health status during the period of employment. These data are available to the employee, his treating physician, and to his designated representative with proper authorization.

Together with the job exposure inventory and individual exposure information, both of which are computerized for long-term storage, a worker registry is thus established that includes exposure information and records of health events. These data, when retained over sufficient time periods, constitute a data base from which data for epidemiologic inquiry can be obtained.

This information system utilizes universal codes, and is sufficiently elastic to allow identification, quantification, or evaluation, and tests of significance of virtually any variable of

the environment or the health response of the individual. It constitutes the mechanism whereby a continuing prospective longitudinal study of the factors pertaining to risk and health effect can be recorded and studied.

2.4 MEDICAL ASSISTANCE TO SUPPORT HEALTH MONITORING

Adequate medical facilities and personnel will provide medical care for employees, and to respond to emergencies. The medical facility will be capable of providing first aid for treatment of minor injuries, for routine medical examinations, and emergency response requirements. During the construction phase, a dispensary should be adequate. During operation, a larger and more comprehensive permanent installation will be utilized. This facility will support the usual modality of examination and treatment equipment, and may include instrumentation to do electrocadiography, cardiac monitoring, spirometry, and audiometry. The usual diagnostic instruments and supplies for treatment will also be available.

An emergency vehicle will be available that will meet the applicable DOT standards. It will be used in rescue operations and to transport injured personnel to sources of definitive medical care. It will be made available to medical and rescue personnel and will be adequately equipped to sustain monitoring operations and life-maintenance during transport. Helicopter ambulances will be used for emergency evacuation.

The supervising physician will familiarize himself or herself with the operating characteristics and the health and safety hazards of the entire

operation and will participate in the definition of the emergency response plan, the transportation of ill or injured employees on an emergency basis, and the provision of definitive medical care in adjacent medical facilities.

The medical unit will be staffed with trained, experienced individuals, either a registered nurse with occupational health experience, preferably certified in occupational health nursing, or a physician assistant who is similarly well trained. Either nurse or physician assistant will also familiarize himself or herself with the details of the operation and health and safety hazards of the plant and its operations.

SECTION 3

SAFETY PROGRAM

The White River Shale Oil Corporation will undertake to operate a safe facility, both in its underground and surface operations. Compliance with standards will be assured, and engineering design measures and administrative practice will be employed to mitigate known hazards.

The White River Shale Project will be regulated under a duality of standards. The Federal Mine, Safety and Health Act applies to mining and non-continuous operations; the Federal Occupational Safety and Health Act applies to all other above ground operations. The project is also subject to Utah state and local public and occupational health regulations and standards.

Construction hazards associated with the opening of a mine adit, the initial development of the underground operation, and the construction and assembly of necessary building and equipment provide hazards which are typical of those encountered during similar construction activities elsewhere.

Recognizing that engineering design and administrative control cannot completely eliminate hazards, additional programs aimed at maintaining a safe and healthy environment will be employed.

Table 3-1 presents a summary of anticipated safety hazards and proposed mitigation for each.

Table 3-1 - Summary of Public Safety Measures[a]

Type of Activity	Construction Phase of Each Activity		Operation Phase of Each Activity	
	Hazards	Protective Measures	Hazards	Protective Measures
Mine Portals and Shafts	Blasting, material and equipment movement	Access road control with guards and signs, plus additional signs around blasting area (accepted safety practice when blasting)	Mine shafts and equipment movement in and out of mine	Entire process area, stockpile, and mine area is fenced and/or placarded with warnings
Process and Tankage Areas Phase I	Blasting, grading, and hauling equipment, etc.	Same as above. Area to be fenced as soon as possible	Process equipment, mass material movement, flammable hydrocarbon storage, etc.	Process area and mining activities will be fenced and placarded and access road entrance controlled
Access Road	Same as above	Flagman and placarding as required	Heavy truck and equipment traffic	Frequent speed limit signs and caution signs, and restriction of access to mine and process areas

[a] Adapted from White River Shale Project Detailed Development Plan, August 1981, Table 4.12-1.

Table 3-1 (Contd)

Type of Activity	Construction Phase of Each Activity		Operation Phase of Each Activity	
	Hazards	Protective Measures	Hazards	Protective Measures
Other Passages Through or Into the Tracts	No improvements planned. Road crossing in Southam Canyon may be hazardous during processed shale disposal operations	Placarding all roads entering tract	Occasional traffic of heavy trucks and other equipment	Same as construction phase
Processed Shale Disposal Phase I	Conveyors, trucks, and construction equipment movement	No public access. Placarding restricting access to fill area and conveyor truck routes	Conveyor trucks and equipment movement at fill site	No public road approaches this area. Placarding along routes and fill area restricting access
Impoundments Freshwater Reservoir	Construction equipment and material movement for dam	Placarding around site	No water quality hazard. Trespassing on dam may be hazardous	Placarding to discourage trespassing and swimming. Fencing of dam to prohibit trespassing
Impoundments South of Processed Shale Disposal Fill	Same as for processed shale disposal	Provisions same as for processed shale disposal	Water may be contaminated by contact with processed shale	Pool and dam placarded

Safety and educational programs will also be conducted by a competently trained safety professional. A supervisor of Health and Safety is already at the mine site during daylight shifts to monitor construction activities.

Safety professionals will continually reevaluate jobs and working conditions to detect hazards that may have been overlooked in the layout of the mine or plant or in the design of the machinery, equipment, and processes, or that may have developed after production started. Employees will be given indoctrination and training to familiarize them with the health and safety aspects of their job and with their responsibility for their own safety and that of their fellow workers.

The minimum training for employees assigned to areas regulated by the Federal Mine Safety and Health Act will be:

(1) Inexperienced employees hired for work underground shall receive 40 hours of training before being allowed to work in an actual production mode.

(2) Inexperienced employees hired for work on the surface area of the underground mine will receive 24 hours of training.

(3) All employees will receive at least 8 hours of annual refresher training related to the health and safety of their jobs.

(4) All employees, when assigned to a new task, work location, or machine, will be given sufficient training to safely perform their duties.

During the production phase there will be a mine rescue station at the mine with sufficient equipment to outfit two mine rescue teams for an extended mine rescue effort. A minimum of 2 six-man mine rescue teams will be maintained.

Mine rescue team members will be given 20 hours of training in the use and maintenance of oxygen breathing apparatus and in mine rescue techniques. Following the initial 20 hours, the rescue teams will train at least four hours per month or eight hours every two months.

A fire brigade will be established after the construction phase. Members of the fire brigade will receive 20 hours of training on use of dry chemical, water, and foam to combat fire. Training will include fire-fighting techniques, use of protective equipment, hazards due to chemicals, etc.

The brigade will have a four-hour practice session every two months.

Operating manuals for "Good Work Practices," accident prevention procedures, instructional manuals, and material safety data sheets will be developed and maintained in current status at the workplace.

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(June 1984)

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